

REMARKS

Claims 1-18, 23-26 and 37-39 were pending in the application at the time the present Office Action was mailed, claims 19-22 and 27-36 having been withdrawn from consideration pursuant to an earlier Restriction Requirement. Claims 1, 12, 18 and 23 have been cancelled without commenting on or conceding the merits of the rejections of these claims, and without prejudice to pursuing these claims in one or more continuation, divisional, reissue, and/or other applications. Claims 2-11, 13-17 and 24-26 have been amended by the present response. More specifically, claims 9-11, 13-15 and 24-26 have been rewritten in independent form to include all the features of the corresponding base claim and any intervening claims. Accordingly, any subsequent rejection of these claims based on new grounds cannot be made final. Claims 2-7, 16 and 17 have been amended to change their dependencies. Based on the foregoing, claims 2-11, 13-17, 24-26 and 37-39 remain pending in the present application.

Claims 1-18, 23-26 and 37-39 were rejected in the present Office Action. More specifically, the status of the claims in light of the present Office Action is as follows:

- (A) Claims 1-8, 12-14, 16-18 and 23-25 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,704,625 to Albero et al. ("Albero"); and
- (B) Claims 9-11, 15, 26 and 37-39 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Albero.

The undersigned attorney wishes to thank the Examiner for engaging in a telephone conference on May 24, 2005 to discuss the present Office Action. During the course of the telephone conference, the undersigned attorney and the Examiner discussed a number of distinctions between the applied reference and the pending claims. Further, the undersigned attorney pointed out a number of reasons why it would not have been obvious to modify Albero to provide the features of the pending claims. The following remarks summarize the points raised during the telephone conference, and reflect the agreements reached.

A. Response to the Section 102 Rejection of Claims 1-8, 12-14, 16-18 and 23-25

Claims 1-8, 12-14, 16-18 and 23-25 were rejected under 35 U.S.C. § 102(e) as being anticipated by Albero. Claims 1, 12, 18 and 23 have been cancelled without commenting on or conceding the merits of the rejections of these claims. Accordingly, the rejections of claims 1, 12, 18 and 23 are now moot.

Claims 2-8 have been amended to depend from base claim 9. Base claim 9 is allowable over Albero for at least the reasons discussed below with regard to the Section 103 rejection of claim 9. Accordingly, dependent claims 2-8 are also allowable over Albero for at least this reason, and for the additional features of these dependent claims. Therefore, the rejections of dependent claims 2-8 should be withdrawn.

1. Independent Claims 13 and 24 Are Directed to Aircraft That Include, *Inter Alia*, a Wing Ice Protection System Configured to Receive Electric Power From an Electric Generator Operably Coupled to an Auxiliary Power Unit

Claims 13 and 24 have been rewritten in independent form to include all the features of the corresponding base claim and any intervening claims. As amended, these claims are directed to aircraft that include, *inter alia*, a jet engine, a first electric generator configured to receive shaft power from the jet engine, and a wing ice protection system configured to receive electric power from the first electric generator in the absence of bleed air from the jet engine.

The aircraft of claims 13 and 24 further include a second electric generator configured to receive shaft power from an auxiliary power unit. In addition to receiving electric power from the first electric generator, the wing ice protection system is also configured to receive electric power from the second electric generator in the absence of compressed air from the auxiliary power unit.

2. Albero Discloses an Aircraft Power System In Which an Auxiliary Power Unit Is Provided to Start the Engines

As shown in Figures 1A and 1B of Albero, this reference discloses an aircraft having a first engine 10, a second engine 10', a wing anti-icing device 58, and an auxiliary power unit (APU) 30. Unlike claims 13 and 24, the APU 30 of Albero does not

provide power to the wing anti-icing device 58. Instead, as Albero explicitly states in column 2 at lines 55-56, the "auxiliary power unit (APU) 30 is provided to start the engines 10 and 10'." Once the engines 10 and 10' have been started, the engines, not the APU, provide power to the wing anti-icing device 58 via the starter/generators 18.

As Albero explains, "The starter/generators 18 provide electrical power to the motor drives 56...," and "The electrically driven compressors [of the wing anti-icing devices 58] may be electrically connected to the motor drives 56 in any suitable manner known in the art." (Albero at column 4, lines 26-29; and at column 3, lines 32-34).

3. Albero Cannot Support a Section 102 Rejection of Independent Claims 13 and 24 for at Least the Reason That This Reference Fails to Teach or Suggest an Aircraft in Which a Wing Ice Protection System Receives Electric Power From an Auxiliary Power Unit

Independent claims 13 and 24 were rejected under 35 U.S.C. § 102 as being anticipated by Albero. According to the MPEP, "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." (MPEP § 2131). In the present case, Albero fails to provide each and every element as set forth in claims 13 and 24. Specifically, each of these claims requires a wing ice protection system configured to receive electric power from an electric generator operably coupled to an APU. Nowhere, however, does Albero teach or suggest this feature. In contrast, all Albero states in this regard is that the "auxiliary power unit (APU) 30 is provided to start the engines 10 and 10'." (Albero at column 2; lines 55-56). Accordingly, Albero cannot support a proper Section 102 rejection of independent claims 13 and 24 for at least this reason and that the rejection should be withdrawn.

4. Independent claims 14 and 25 Are Directed to Aircraft That Include, *Inter Alia*, an Electrothermal Wing Ice Protection System with at Least One Heating Element Positioned Proximate to an Interior Portion of a Wing

Claims 14 and 25 have been rewritten in independent form to include all the features of the corresponding base claims and any intervening claims. Both of these claims are directed to aircraft that include, *inter alia*, a wing ice protection system that is

configured to receive electric power from an electric generator operably coupled to an engine. The wing ice protection system is an electrothermal system that includes at least one heating element positioned proximate to an interior portion of the wing. The heating element can be energized with electric power from the electric generator to warm the portion of the wing to at least reduce the formation of ice on the wing.

5. Albero Cannot Support a Section 102 Rejection of Independent Claims 14 and 25 for at Least the Reason That This Reference Fails to Teach or Suggest an Electrothermal Wing Ice Protection System having a Heating Element Positioned Proximate to an Interior Portion of a Wing

The aircraft of independent claims 14 and 25 each include an electrothermal wing ice protection system that includes at least one heating element positioned at least proximate to an interior portion of a wing. Nowhere does Albero teach or suggest this feature. In contrast, Albero teaches a wing anti-icing device 58 that includes "an electrically driven compressor (not shown) for heating air and running the heated air along the leading edge portion of the wings." (Albero at Column 3; lines 28-32).

As the quoted language makes clear, the wing anti-icing device 58 of Albero is nothing more than a conventional anti-icing device that pumps heated air along the leading edge portion of a wing. In contrast, the wing ice protection system of claims 14 and 25 includes "at least one heating element ... which can be energized with electric power to warm the portion of the wing to at least reduce the formation of ice on the wing." Nowhere does Albero teach or suggest this "electrothermal" heating element of claims 14 and 25. Therefore, Albero cannot support a Section 102 rejection of independent claims 14 and 25 for at least this reason and the rejection should be withdrawn.

B. Response to the Section 103 Rejection of Claims 9-11, 15, 26 and 37-39

Claims 9-11, 15, 26 and 37-39 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Albero.

1. Independent Claims 9 and 37 Are Directed to Aircraft That Include, *Inter Alia*, an Environmental Control System Having an Adjustable Speed Compressor Motor Configured to Vary Compressor Speed in Response to Changes in Pressurization Demands

Claim 9 has been rewritten in independent form to include all the features of corresponding base claim 1 and any intervening claims. Claims 9 and 37 are directed to aircraft that include, *inter alia*, an environmental control system configured to provide outside air to a passenger cabin. The environmental control system includes at least one adjustable speed compressor motor configured to receive power from an electric generator operably coupled to an engine of the aircraft. The adjustable speed motor is configured to vary compressor speed in response to the pressurization demands of the fuselage.

2. Albero Cannot Support a Section 103 Rejection of Independent Claims 9 and 37 for at Least the Reason That This Reference Fails to Teach or Suggest an Environmental Control System Having an Adjustable Speed Motor Configured to Vary Compressor Speed in Response to Changes in Pressurization Demands

Independent claims 9 and 37 were rejected under Section 103 as being unpatentable over Albero. To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim features. (MPEP 2143; emphasis added). In the present case, the Albero reference does not teach or suggest all the features of claims 9 and 37. Indeed, even the Office Action acknowledges that this reference fails to disclose the adjustable speed compressor motor of claims 9 and 37. See, for example, the Office Action at page 8: "Albero et al. discloses most of the claimed invention except for an *adjustable speed motor*."

In an attempt to cure the deficiencies of Albero, the Examiner goes on to state, "It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the motor of Albero et al. so that the motor has an adjustable speed, since it has been held that the provision of variability/adjustability, where needed, involves only routine skill in the art." (Office Action at page 8). The applicants respectfully disagree with this unsupported assertion for a number of reasons. First, it would not have been obvious to modify the electric motor of Albero to be an adjustable speed motor because ECS compressor motors of the prior art are

typically "on/off" type motors. That is, the motor is turned "on" when needed and "off" when not needed. Prior art compressor motors are typically not adjustable speed motors because there is no mechanism by which to modulate the power supply.

Second, nowhere has the Examiner directed the applicants to *any* portion of Albero (or *any* other prior art reference, for that matter) that suggests a motivation to modify the electric motor of Albero to produce the claimed invention. All the Office Action says in this regard is that it "would have been obvious" to modify Albero "so that the motor has an adjustable speed." Nowhere, however, has the Office Action identified or even suggested why Albero would need an adjustable speed motor.

Third, it is a gross oversimplification to characterize the adjustable speed motor of claims 9 and 37 as providing nothing more than "variability/adjustability." In fact, these claims call for much more. Specifically, they require an adjustable speed motor that is "configured to vary compressor speed in response to the pressurization demands of the fuselage." Nowhere does Albero teach or suggest varying compressor speed in response to fuselage pressurization demands and, indeed, nowhere does the Examiner even attempt to address this aspect of the claims or identify where Albero (or any other prior art reference, for that matter) teaches this feature.

Finally, the MPEP 2143 clearly states that the prior art reference (or references when combined) must teach or suggest all the claim features for a proper *prima facie* case of obviousness. In the present case, this requirement has not been met. Instead, this requirement has been dispensed with by the simple expedient of merely asserting that it would have been obvious to modify the prior art references to include the missing claim features. If the Examiner maintains this rejection, the applicants respectfully request that the Examiner cite at least one prior art reference that can be properly combined with the primary reference of Albero to provide the missing claim features. Absent this, the Office Action has not established a *prima facie* rejection of independent claims 9 and 37 and the rejection should be withdrawn.

Claims 38 and 39 depend from base claim 37. Accordingly, Albero cannot support a Section 103 rejection of dependent claims 38 and 39 for at least the reason that this reference cannot support a Section 103 rejection of base claim 37, and for the

additional features of these dependent claims. Therefore, the rejection of dependent claims 38 and 39 should be withdrawn.

3. Independent Claims 15 and 26 Are Directed to Aircraft That Include, *Inter Alia*, an Electromechanical Wing Ice Protection System having at Least One Mechanical Actuator That Can be Activated to Vibrate a Portion of a Wing

Independent claims 15 and 26 have been rewritten in independent form to include all the features of the corresponding base claims and any intervening claims. Claims 15 and 26 are directed to aircraft that include, *inter alia*, a wing ice protection system configured to receive electric power from an electric generator operably coupled to a jet engine. In these claims, the wing ice protection system is an electromechanical system that includes at least one mechanical actuator positioned at least proximate to an interior portion of the wing. The actuator can be activated with electric power from the electric generator to vibrate the portion of the wing to at least reduce the formation of ice on the wing.

4. Albero Cannot Support a Section 103 Rejection of Independent Claims 15 and 26 for at Least the Reason That This Reference Fails to Teach or Suggest an Electromechanical Wing Ice Protection System Having at Least One Mechanical Actuator Configured to Vibrate a Portion of a Wing

Independent claims 15 and 26 are directed to aircraft that include, *inter alia*, electromechanical wing ice protection systems having mechanical actuators configured to vibrate a portion of a wing. Nowhere does Albero teach or suggest this feature. Indeed, even the Office Action acknowledges that Albero lacks this feature. See, for example, the Office Action at page 8: "Albero et al. discloses most of the claimed invention *except for an actuator for vibrating a portion of the wing to reduce the formation of ice.*"

In an attempt to cure the deficiencies of Albero, the Office Action takes official notice "that using [an] actuator for vibrating a portion of the wing to reduce the formation of ice is a well known technique in the art." (Office Action at page 8). The Applicants respectfully traverse this assertion. Furthermore, even assuming (and applicants expressly do not) that such electromechanical wing ice protection devices were known

at the time of the present invention, one of ordinary skill in the art would still not have been motivated to combine such a device with the system taught by Albero.

MPEP 2143.03 states "If the applicant traverses an assertion [of official notice], the examiner should cite a reference in support of his or her position." As set forth above, the applicants respectfully traverse the Examiner's assertion that "using [an] actuator for vibrating a portion of the wing to reduce the formation of ice is a well known technique in the art." Accordingly, the applicants respectfully request that the Examiner comply with MPEP 2143.03 and cite a reference that supports her position. Absent such a cite, the Examiner has failed to establish a *prima facie* case of obviousness with regard to independent claims 15 and 26 and the rejection should be withdrawn.

5. Albero Cannot Support a Section 103 Rejection of Independent Claim 10 for at Least the Reason That This Reference Fails to Teach or Suggest an Aircraft Having a Variable-Speed Fuel Pump Configured to Receive Electric Power from an Electric Generator Operably Coupled to a Jet Engine

Independent claim 10 has been rewritten in independent form to include all the features of corresponding base claim 1 and any intervening claims. Claim 10 is directed to an aircraft that includes, *inter alia*, an electric generator operably coupled to a jet engine, and a variable-speed fuel pump configured to receive electric power from the electric generator. The variable-speed fuel pump is configured to transfer fuel from a fuel tank to the jet engine at variable speeds *based on the demand for fuel by the engine*.

Nowhere does Albero teach the variable-speed fuel pump of claim 10. Indeed, the Office Action acknowledges this deficiency by stating "Albero et al. discloses most of the claimed invention *except for a variable speed fuel pump*." To cure this deficiency, however, the Office Action again makes the unsupported assertion that "It would have been obvious to one having ordinary skill in the art at the time of the invention to have made the fuel pump of Albero et al. so that the fuel pump has a variable speed." The applicants respectfully traverse this assertion for at least the reason that, in fact, conventional fuel pumps are typically operated in an "on/off" manner, not at variable

speeds. Accordingly, it would not have been "obvious to one of ordinary skill in the art" to have modified the fuel pump of Albero to be a variable-speed fuel pump.

Furthermore, even assuming (and applicants expressly do not) that such variable speed fuel pumps were known at the time of the invention, the Office Action still fails to identify where Albero (or *any* prior art reference, for that matter) teaches transferring fuel from a fuel tank to a jet engine at variable speeds *based on the demand for fuel by the engine*, as required by claim 10. Therefore, if the Examiner maintains this assertion, the applicants respectfully request that the Examiner cite at least one prior art reference that can be properly combined with the Albero reference to provide the missing variable-speed fuel pump of claim 10. Absent such a cite, the Examiner has failed to establish a *prima facie* rejection of independent claim 10 and the rejection should be withdrawn.

6. Alberto Cannot Support a Section 103 Rejection of Independent Claim 11 for at Least the Reason That This Reference Fails to Teach or Suggest an Environmental Control System Having at Least One Variable-Speed Fan Configured to Flow Air to a Passenger Cabin at a Plurality of Flow Rates in Response to Changes in Flow Rate and/or Pressurization Demands

Claim 11 has been rewritten in independent form to include all the features of corresponding base claim 1 and any intervening claims. Claim 11 is directed to an aircraft that includes, *inter alia*, an environmental control system configured to receive electric power from an electric generator operably coupled to a jet engine. The environmental control system includes at least one variable speed fan configured to flow air to a passenger cabin at a plurality of flow rates in response to changes in at least one of flow rate and pressurization demands of the fuselage.

Nowhere does the Albero reference teach or suggest an environmental control system having at least one variable speed fan configured to flow air to a passenger cabin in response to changes in either flow rate or pressurization demands of the fuselage. Indeed, the Office Action acknowledges this deficiency by stating "Albero et al. discloses most of the claimed invention *except for [a] variable speed fan.*" (Office Action at page 8).

To overcome the deficiencies of Albero, the Office Action asserts that "It would have been obvious to one having ordinary skill in the art at the time of the invention to have modified the fan of Albero et al. so that the fan has a variable speed, since it has been held that the provision of variability/adjustability, where needed, involves only routine skill in the art." The applicants respectfully traverse this unsupported assertion for a number of reasons. First, the Office Action fails to cite any portion of the prior art that identifies a "need" for modifying the fan of Albero. Second, it would not have been obvious to modify the fan of Albero to be variable speed because, at the time of the present invention, environmental control systems utilized "on/off" type fan systems, and fuselage pressurization demands were met by opening and closing outlet vents as needed. Accordingly, if the Examiner maintains the rejection, the applicants respectfully request that the examiner comply with MPEP 2144.03 and cite at least one prior art reference that can be properly combined with Albero to provide the missing features of claim 11.

Third, even though the Office Action states "it has been held that the provision of variability/adjustability, where needed, involves only routine skill in the art," the Office Action fails to provide a cite to this holding. Absent such a cite, the applicants have not been given a fair opportunity to respond to the rejection because they have not been given an opportunity to review the context of this holding. Nevertheless, it appears that the Office Action was referring to Section 2144.04 III.(D) of the MPEP. If so, the Office Action is misinterpreting this holding. Specifically, this section of the MPEP states: "The court held that adjustability, where needed, is not a patentable advance, and because there was an art recognized need for adjustment in a fishing rod, the substitution of a universal joint for the single pivot of the prior art would have been obvious." In the present case, however, the Examiner has failed to identify any "art-recognized need" for replacing the fans taught by Albero with the variable-speed fans of the present invention. Indeed, the Applicants assert there is no "art-recognized need" that would make such a change obvious, and this assertion is supported by the fact that Albero fails to make any mention whatsoever of variable-speed fans. Therefore, for at least these reasons, Albero cannot support a Section 103 rejection of independent claim 11 and the rejection should be withdrawn.

In view of the foregoing, the pending claims comply with 35 U.S.C. § 112 and are patentable over the cited art. The applicant accordingly requests reconsideration of the application and a Notice of Allowance. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to call the undersigned at (206) 359-6351.

Respectfully submitted,

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